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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/033,451	12/27/2001	Mika Kahola	460-010813-US(PAR)	9268

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EXAMINER	
FERNANDEZ RIVAS, OMAR F	

ART UNIT	PAPER NUMBER
2129	

DATE MAILED: 07/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/033,451	KAHOLA, MIKA	
	Examiner	Art Unit	
	Omar F. Fernández Rivas	2129	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 April 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *A1,A2,A3*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to an RCE filed by the Applicant entered on April 27, 2006.

2. The Office Actions of February 24, 2005, October 24, 2005 and April 13, 2006 are incorporated into this Non-Final Office Action by reference.

Status of Claims

3. Claim 17 has been amended. Claim 1 has been cancelled. Claims 2-17 are pending on this application.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 2-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Agrawal et al. in view of La Porta et al in view of Lewis (US Patent #6,072,990, referred to as **Agrawal**; US Patent #6,654,359, referred to as **La Porta**; US Patent #5,687,290, referred to as **Lewis**)

Claim 2

In the method of claim 17 as taught by Agrawal, a target value is determined to the packet error rate aimed to be kept substantially the same as the target value, and the difference between the packet error rate and target value is used as control variable in the method (**Agrawal**: col.4, lin.30-45, Examiner's Note: acceptable word error range implies that there is a target value and the difference between the actual error rate and the target value, defined as error range, is acceptable).

Claim 3

The method of claim 17 as taught by Agrawal, measures packet error rate (**Agrawal**: abstract, lin.4-12) and change of packet error rate (**Agrawal**: col.9, lin.5-7) for inputs of the method. The modified Agrawal's method by adding Lewis's fuzzy control logic takes packet error rate and the change of packet error rate as inputs represented as fuzzy control values, and a set of fuzzy rules is arranged, which are used for determining the effects of the control values to the modulation mode used as a controllable value. (**Agrawal**: abstract, lin.1-14; EN: Agrawal measures packet error rate and the change of packet error rate as inputs to Lewis' fuzzy inference engine that produces control outputs such as power level and modulation modes as taught by Agrawal).

Claims 4-6

Applicant's algorithm as set forth in claims 4-6 has been considered and is given little patentable weight. The algorithm is commonly taught in texts such as Kosko "Neural Network and Fuzzy Systems and Dynamical Systems Approach to Machine Intelligence" page 306-322) and widely used such as Shen ("New Mobility Profile Prediction: An Adaptive Fuzzy Inference Approach" page 370), therefore it is merely a matter of engineering choice in design and not considered to provide any new or unexpected result.

Furthermore, one of ordinary skill in the art would have provided the algorithm, as a design choice taught by Kosko, for the purpose of implementing the fuzzy inference engine for the fuzzy logic taught by Lewis. As a result it would have been obvious to one of ordinary skill in the art at the time of applicants' invention further modify the system taught by Agrawal by choosing the algorithm taught by Kosko to implement the fuzzy inference engine taught by Lewis.

Claim 7

In the modified method of Lewis as defined in claims 3-6 in line with the method of claim 17 taught by Agrawal, the fuzzy control outputs include modulation modes, as in claim 17, each of which is defined as an individual index as in claim 6. The method of Lewis in view of Kosko has the following steps: An initiation phase, wherein one of said indexes is selected in order to select the modulation mode used in communication

selection (It is inherent in the algorithm taught by Kosko that indexes are chosen to be able to use the algorithm in claim 5. In the context of claim 17 and 5, the indexes represent outputs that include modulation mode); a computing phase, in which the difference of the packet error rate from the target value (**Agrawal:** col.4, lin.36), and the change rate of packet error rate are calculated (**Agrawal**: col.9, lin.5; EN: to response the change of error rate must be calculated); a fuzzy control phase, in which fuzzy control is used for defining the index change of the modulation mode and the modulation mode is selected according to the calculated new index. (It is inherent in the algorithm taught by Kosko that the fuzzy logic algorithm calculates the new index that represents fuzzy outputs that include modulation mode).

Claim 8

In the method of claim 7, the calculating phase and fuzzy control phase are repeated. (**Agrawal**: col.6, lin.17-22; EN: Lewis's fuzzy control logic and Kosko's algorithm are used in the context of Agrawal, therefore the calculating phase and fuzzy control phase are repeated).

Claims 9-11

In the method of claim 17, Agrawal teaches a transmitter that encodes transmitted data from encoding schemes that includes modulation modes. The operating point of transmitter is defined by power code that anticipates transmission power. The selected modulation modes and transmission power will produce desired

packet error rate (**Agrawal**: col.5, lin.65-67; col.6, lin.1-22; EN: the encoding schemes are implemented using Lewis's fuzzy logic as taught in claim 17).

Claim 12-14

Claims 12-14 are systems claims that correspond to method claims 17 and 2-3 respectively. Therefore claims 12-14 are rejected under the same rationale as cited in the rejection of rejected claims 17 and 2-3 respectively.

Claim 15

Agrawal teaches a system for transmitter and receiver pair in wireless communication network as discussed in claim 17. Even though Agrawal does not mention explicitly an access point controller in the system, Agrawal does not limit the number of transmitter-receiver pairs and the type of communication terminals (**Agrawal**: col.5, lin.60-64) Should the need of an access pointer controller arise in the system taught by Agrawal, it would have been obvious for an ordinary skill in the art at the time of the invention to modify one of terminals in the communication system taught by Agrawal into an access point controller as one type on communication terminal in the system taught by Agrawal. By treating an access pointer as a wireless terminal, claim 15 is rejected in the same rationale as the rejection rejected in claim 16.

Claim 16

Agrawal teaches a wireless terminal (**Agrawal**: Fig. 1 the transmitter 12 or receiver 13), comprising means for transmitting packet information at least partly wirelessly in a communication system arranged between the wireless terminal and a second communication device (**Agrawal**: Fig. 1 is the communication system with two communication devices communicating wirelessly), means for defining packet error rate (**Agrawal**: col.1, lin.54-64), and means for selecting modulation modes (**Agrawal**: col.6, lin.1).

Agrawal fails to teach selecting modulation modes using fuzzy control. Lewis teaches means for using fuzzy control for selecting modulation mode and at least packet error rate being used as one fuzzy variable as in claim 17. It would have been obvious to one of ordinary skill in the art at the time of applicants' invention to modify the system taught by Agrawal by adding the fuzzy control logic as taught by Lewis in the same rationale as explained in claim 17.

Claim 17

Agrawal teaches a method for performing link adaptation in a communication system (**Agrawal**: Abstract, lin.1-3; Fig.1. Determining the operating point is performing link adaptation), the method comprising: forming a connection to transfer information at least partly wirelessly between two communication devices (**Agrawal**: Abstract, lin.1-3; Fig.1); determining a packet error rate (**Agrawal**: col.1, lin.54-67, col.2, lin.1-13; EN: If data is transferred in packet of words, packet error rate and word error rate are

considered to be the same); and selecting a modulation mode for the connection from at least two different modulation modes (**Agrawal**: col.5, lin.65-67; col.6, lin.1-2; EN: encoding schemes include modulation modes);

Agrawal does not teach forming packets from the information to be transferred via the connection, said packets comprising a header and a payload.

La Porta teaches forming packets from the information to be transferred via the connection, said packets comprising a header and a payload (**La Porta**: col.34, lin.9-17).

It would have been obvious to one of ordinary skill in the arts at the time of the applicant's invention to modify the teachings of Agrawal by incorporating forming packets from the information to be transferred via the connection, said packets comprising a header and a payload as taught by La Porta for the purpose of conveying in the message information describing the destination address (header) where the message (payload) is to be received.

Agrawal does not teach said selecting a modulation mode comprises using fuzzy control; and using said packet error rate as one variable for said fuzzy control.

Lewis teaches said selecting a modulation mode comprises using fuzzy control (**Lewis**: col.3, lin.24-34; EN: modulation mode is a network control parameter); and using said packet error rate as one variable for said fuzzy control (**Lewis**: col.3, lin.20-30; col.3, lin.42-47; col.7, lin.63-67, col.8, lin.1-7; EN: packet error rate is an operating parameter of the network).

It would have been obvious to one of ordinary skill in the arts at the time of the applicant's invention to modify the combined teachings of Agrawal and La Porta by having fuzzy control to select the modulation mode using the packet error rate as a variable as taught by Lewis for the purpose of providing a more flexible approach in selecting the way that data is transmitted on networks that operate under unpredictable or rapidly changing domains.

Response to Arguments

6. Applicants arguments regarding claims 2-17 have been fully considered but are not persuasive.

In reference to Applicant's argument:

The reference Lewis is nothing more than a generic description of the use of fuzzy logic. From this the Examiner concludes that it would have been obvious to one skilled in the art to obtain the invention described in the claims of this application. Applicant submits that this is not supported by the cited references.

Examiner's response:

The combination of Agrawal, La Porta and Lewis teach the claimed invention described in the claims and motivation is provided for the combination of the references as set forth above.

In reference to applicant's arguments:

Based on the examiner's assertion, that word error rate is the equivalent of packet error rate, the Examiner continues to assert that the system of the cited reference uses packet error rate in the course of its operation. The system of Agrawal, however, uses, for its particular control purposes, word error rate (WER) or bit error rate (BER). Applicant submits that WER and BER are not the equivalent of packet error rate and therefore, the Examiner's statements with respect to packet error rate are technically incorrect.

Examiner's response:

A network transmits data in the form of packets. Agrawal recites that data is **packetized** into words (each word is a packet). Packets or words are the units of information being transmitted through the network. If an error rate is calculated on the word units being transmitted through the network, then an error is calculated on the packets being transmitted through the network.

In reference to Applicant's arguments:

The Examiner rationalizes this discrepancy in his position as follows: "If data is transferred in packets of words, packet error rate and word error rate is considered to be the same".

BER, WER, and PER are words of art, as indicated in the cited articles, that have been used over a considerable length of time and have acquired meanings that are not subject to poetic license. It is clear from the cited references that the Examiner

statement is just not the case. Based on the teachings of the above cited articles, a person skilled in the art would not use word-error-rate interchangeably with packet-error-rate.

Examiner's response:

The articles talk about bit error rate and how they differ from packet error rate. However, they are silent about word error rate as described in the Agrawal reference. Packet error rate as described by the applicant and word error rate as described by Agrawal are directed to the same thing, the information units being transmitted through the network. Therefore packet error rate and word error rate would be considered equivalent by a person skilled in the arts.

Applicant is reminded that the Examiner has the obligation to interpret the claims in the broadest reasonable manner.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Jorgensen US Patent #6,862,622

Heath et al. US Patent #6,850,498

Cheng et al. US Patent #6,766,309

8. Claims 2-17 are rejected.

Correspondence Information

9. Any inquires concerning this communication or earlier communications from the examiner should be directed to Omar F. Fernández Rivas, who may be reached Monday through Friday, between 8:00 a.m. and 5:00 p.m. EST. or via telephone at (571) 272-2589 or email omar.fernandezrivas@uspto.gov.

If you need to send an Official facsimile transmission, please send it to (571) 273-8300.

If attempts to reach the examiner are unsuccessful the Examiner's Supervisor, David Vincent, may be reached at (571) 272-3080.

Hand-delivered responses should be delivered to the Receptionist @ (Customer Service Window Randolph Building 401 Dulany Street Alexandria, VA 22313), located on the first floor of the south side of the Randolph Building.

Omar F. Fernández Rivas
Patent Examiner
Artificial Intelligence Art Unit 2129
United States Department of Commerce
Patent & Trademark Office

Monday, June 26, 2006

OFR.